

## ASSIGNMENT 3

Textbook Assignment: "The Link-11 System," chapter 4, pages 4-1 through 4-18.

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3-1. Link-11 is designated as which of the following types of tactical data information link?

1. TADIL A
2. TADIL C
3. TADIL J
4. Teletype

3-2. Link-11 communications can operate with which of the following radios?

1. HF only
2. UHF only
3. Either HF or UHF
4. VHF only

3-3. When Link-11 is operated with UHF radio, it is capable of over-the-horizon communications.

1. True
2. False

- A. CDS Digital Computer  
B. SGS Computer  
C. Cryptographic Device  
D. Data Terminal Set  
E. Communications Switchboard  
F. Radio Set

Figure 3A.

IN ANSWERING QUESTIONS 3-4 THROUGH 3-11, SELECT FROM FIGURE 3A THE EQUIPMENT THAT PERFORMS THE FUNCTION DESCRIBED IN THE QUESTION. ITEMS IN THE LIST MAY BE USED MORE THAN ONCE.

3-4. Selects the HF or the UHF transceiver.

1. B
2. C
3. D
4. E

3-5. Encrypts parallel data from the CDS computer and passes the encrypted data to the data terminal set.

1. A
2. B
3. C
4. D

3-6. Correlates reported positions of local and remote tracks.

1. A
2. B
3. C
4. D

3-7. Outputs 24-bit data words to the security equipment via the SGS computer.

1. A
2. B
3. C
4. D

3-8. Multiplexes and modulates parallel data into audio tones.

1. A
2. B
3. C
4. D

3-9. Receives the audio tone package from the data terminal set and transmits the tones.

1. C
2. D
3. E
4. F

3-10. Demodulates the audio tones and checks the six hamming bits for transmission errors.

1. A
2. B
3. C
4. D

- 3-11. Decrypts the 24-bit data word and sends it to the CDS computer.
1. A
  2. B
  3. C
  4. D
- 3-12. Which of the following functions is performed by an antenna coupler?
1. Amplification of the HF radio signal
  2. Impedance matching of the antenna and the radio set
  3. Conversion of atmospheric electromagnetic energy to RF current
  4. Coupling of the data terminal set to the radio
- 3-13. The size of an antenna is determined by which of the following factors?
1. The operating power
  2. The operating frequency
  3. The range of the receiver
  4. The type of data being transmitted
- 3-14. The frequency range of an antenna can be extended by adding which of the following factors?
1. A resistive load only
  2. A capacitive load only
  3. An inductive load only
  4. Either a capacitive or an inductive load
- 3-15. Which of the following functions is NOT performed by the data terminal set?
1. Generating the radio key-line signal
  2. Converting digital data to audio tones
  3. Encrypting CDS computer data
  4. Converting audio tones to digital data
- 3-16. The data terminal set communicates with the radio set via which of the following devices?
1. The communications switchboard
  2. An antenna coupler
  3. The cryptographic device
  4. The SGS computer
- 3-17. Which of the following radio frequency modulation methods is used to minimize propagation-caused signal loss during HF Link-11 operations?
1. Quadrature phase-shift modulation
  2. Frequency modulation
  3. Phase modulation
  4. Amplitude modulation independent sideband
- 3-18. Which of the following individuals is responsible for assigning primary and secondary Link-11 frequencies before the deployment of a task force?
1. The aircraft carrier commanding officer
  2. The net control station track supervisor
  3. The task force commander
  4. The fleet CinC
- 3-19. When a Link-11 net is established, which of the following sequences of operations should be followed to determine readiness of all units to enter the net?
1. Net Test, Net Sync, roll call
  2. Net Sync, Net Test, roll call
  3. Net Sync, Net Test, Broadcast
  4. Roll call, Net Test, Net Sync
- A. Net Synchronization
  - B. Net Test
  - C. Roll Call
  - D. Broadcast
  - E. Short Broadcast
  - F. Radio Silence

Figure 3B.

IN ANSWERING QUESTIONS 3-20 THROUGH 3-25, SELECT FROM FIGURE 3B THE OPERATING MODE DESCRIBED IN THE QUESTION.

3-20. What Link-11 operating mode establishes a uniform time base from which all net communications are normally initiated?

1. A
2. B
3. C
4. D

3-21. In what Link-11 operating mode is each picket unit interrogated, in turn, by NCS?

1. A
2. B
3. C
4. D

3-22. What Link-11 operating mode provides an overall evaluation of net and equipment performance?

1. B
2. C
3. D
4. E

3-23. In what Link-11 operating mode will one participating unit transmit data continuously to all other net members?

1. C
2. D
3. E
4. F

3-24. In what Link-11 operating mode are the radio set key line and data terminal audio output inhibited?

1. C
2. D
3. E
4. F

3-25. In what Link-11 operating mode is a single data transmission sent only when the operator depresses the TRANSMIT START button?

1. B
2. C
3. D
4. E

3-26. Net Sync continuously broadcasts which of the following signals?

1. Phase reference frames
2. Start codes
3. Stop code
4. Preamble frames

3-27. When the stored sync mode is operating, the picket station uses which of the following signals to establish a time base?

1. An external frequency standard
2. The internal frequency standard in the DTS
3. The sync signal received from NCS
4. The sync signal received from another picket

3-28. Which of the following functions is NOT tested when Net Test is running?

1. DTS to radio interface
2. CDS computer to DTS interface
3. Radio to antenna interface
4. Radio receiver function

3-29. The preamble of a Link-11 message consists of a total of how many frames?

1. Five
2. Six
3. Seven
4. Eight

3-30. During transmission of the preamble, the 605-Hz tone is transmitted at which of the following power levels?

1. - 6 dB
2. + 6 dB
3. -12 dB
4. +12 dB

- 3-31. To enable the DTS to detect frame transitions during the preamble, the 2915-HZ sync tone is phase shifted how many degrees at each frame?
1. 90
  2. 180
  3. 270
  4. 360
- 3-32. The phase reference frame of a Link-11 header performs which of the following functions?
1. Provides synchronization between the DTS and the CDS computer
  2. Provides a time reference for the DTS
  3. Provides a time reference for the radio
  4. Provides the reference to extract the data in the next frame
- 3-33. During a receive cycle, the start code causes which of the following actions?
1. The CDS computer to send the prepare to receive data interrupt
  2. The DTS to send the prepare to receive data interrupt
  3. The CDS computer to send the prepare to transmit data external function
  4. The DTS to send the prepare to transmit data interrupt
- 3-34. Exactly how many data bits are contained in each Link-11 information frame?
1. 18
  2. 24
  3. 30
  4. 32
- 3-35. The control stop code is generated by which of the following units?
1. NCS only
  2. Picket station only
  3. Either NCS or a picket station, indicating the end of a control message
- 3-36. During a receive cycle, the stop code (control or picket) causes which of the following actions?
1. The CDS computer to send the end of data interrupt
  2. The DTS to send the end of data external function
  3. The CDS computer to send the end of receive interrupt
  4. The DTS to send the end of receive interrupt
- 3-37. A call-up, or interrogation message, consists of a total of how many frames?
1. Five
  2. Six
  3. Seven
  4. Eight
- 3-38. The two frames following a control stop code indicate which of the following?
1. The address of the NCS
  2. The next picket address in the roll call
  3. The end of the NCS message
  4. The last address interrogated
- 3-39. A picket reply message is sent in which of the following sequences?
1. Preamble, phase reference, data, stop code
  2. Preamble, phase reference, start code, data, control stop code
  3. Preamble, phase reference, start code, data, picket stop code
  4. Phase reference, preamble, start code, data, stop code
- 3-40. The DTS operates in full duplex when it performs which of the following operations?
1. System testing
  2. Net Test
  3. Normal operations
  4. Short Broadcast

3-41. The DTS performs which of the following functions?

1. Data encryption
2. Error detection and correction
3. Track gridlock
4. Transmitting data tones on a carrier frequency

3-42. The six hamming bits added to the data word enables the DTS to correct what maximum number of data bits?

1. One
2. Two
3. Three
4. Four

3-43. The DTS is operating in the detect and correct mode. A data word is received by the CDS computer with bit 24=0, and bit 25=1. Which of the following conditions is indicated by this bit combination?

1. No errors detected
2. Parity error(s) detected
3. Odd bit error(s) detected, correction attempted
4. Even errors detected, no correction attempted

3-44. The DTS develops a composite signal consisting of what total number of frequency division multiplexed audio-frequency tones?

1. 2
2. 11
3. 16
4. 30

3-45. Bits 4 and 5 of a 30-bit data word are carried by which of the following audio tone frequencies?

1. 935 Hz
2. 1155 Hz
3. 1265 Hz
4. 1705 Hz

3-46. What is the basic unit of the Link-11 transmission?

1. Bit
2. Tone
3. Frame
4. Doppler

3-47. In a single frame, the DTS can tolerate what maximum phase shift error without generating an error code?

1. + 44 degrees only
2. - 44 degrees only
3.  $\pm$  44 degrees
4.  $\pm$ 135 degrees

3-48. A phase-shift error of +105 degrees in any one of the data tones will cause a single bit to be erroneous.

1. True
2. False

3-49. Which of the following Link-11 signals allows the receiving unit to correct errors caused by the relative motion between the sending and receiving units?

1. Sync tone
2. Doppler tone
3. Data carrying tones
4. Motion correct tone

3-50. During the preamble, the 2915-Hz tone sets which of the following references?

1. Frame timing when the DTS is in corrected timing
2. Signal power levels when the DTS is in corrected timing
3. Frame timing when the DTS is in stored timing
4. Signal power levels when the DTS is in stored timing

3-51. During the reception of the data segment of a Link-11 message, the 605-Hz Doppler tone should be at which of the following power levels?

1. +12 dB
2. + 6 dB
3. - 6 dB
4. 0 dB

- 3-52. When the DTS is in the OPERATE mode, exactly how many fault-sensing sensors can cause the SUMMARY FAULT lamp to light?
1. 11
  2. 14
  3. 23
  4. 27
- 3-53. The LAMP TEST switch on the Mode Control Panel will cause all of which of the following lamps to light?
1. Those on the mode control panel only
  2. Those on the TADIL A control panel only
  3. Those on the address control unit only
  4. Those on the mode control panel, the TADIL A control panel, and the address control unit
- 3-54. When the FULL-DUPLEX/HALF-DUPLEX switch is in the FULL-DUPLEX POSITION, the transmit sidetone is processed for input to the computer.
1. True
  2. False
- 3-55. When the SIDEBAND SELECT switch is in the DIV position, which sideband signal is processed for input to the computer?
1. USB only
  2. LSB only
  3. The combination of the USB and LSB signals
  4. Either the USB or the LSB, depending on the signal quality of each sideband
- 3-56. During normal Link-11 operations, the DATA RATE switch on the mode control panel should be in which of the following positions?
1. 1,200 bps
  2. 2,400 bps
  3. DUAL 1,200 bps
  4. TADIL A
- 3-57. The SYNC MODE switch on the mode control panel is used in conjunction with which of the following switches on the TADIL A control panel?
1. OPERATE/RADIO SILENCE switch
  2. NET CONTROL/PICKET switch
  3. TIMING STORED/CORRECTED switch
  4. ERROR CORRECT/LABEL switch
- 3-58. When the SYNC MODE switch is placed in the FAST position, synchronization is obtained by which of the following methods?
1. Use of the frame timing reference stored during Net Sync
  2. Use of the frame timing reference obtained from the preamble of, the current message only
  3. Use of the frame timing reference obtained at each data frame of the current message only
  4. Use of both the frame timing reference obtained during the preamble and the frame timing of each frame of the current message
- 3-59. The NET BUSY indicator of the TADIL A control panel is activated by which of the following signals?
1. Signal presence
  2. Receive mode
  3. Transmit mode
  4. Start code detected
- 3-60. The SYNC COMPT indicator is lighted after the DTS has achieved which of the following conditions?
1. It is in sync with the radio
  2. It is using stored synchronization signals
  3. It is in sync with NCS
  4. It is testing the internal sync circuits

- 3-61. The TIMING/STORED/CORRECTED switch is set to the STORED position. Which of the following signals will the DTS use for frame timing synchronization?
1. The frame timing reference stored during Net Sync
  2. The frame timing reference obtained from the preamble of the current message only
  3. The frame timing reference obtained at each data frame of the current message only
  4. Both the frame timing reference obtained during the preamble and the frame timing of each frame of the current message
- 3-62. When the ERROR CORRECT/LABEL switch is in the CORRECT position, the DTS is capable of performing which of the following operations?
1. Detecting and correcting an even number of bit errors in the received data word
  2. Detecting and correcting an odd number of multiple bit errors in the received data word
  3. Detecting and correcting a single bit error in each received data word
  4. Detecting and correcting a single bit error in the received data message
- 3-63. When you depress the TRANSMIT RESET switch on the TADIL A control panel, it causes the DTS to perform which of the following operations?
1. To immediately stop all transmissions
  2. To inhibit the generation of output data requests, generating a stop code and ending the current transmission
  3. To place the radio in radio silence
  4. To inhibit the generation of input data requests, generating a stop code and ending the current reception
- 3-64. The DTS is configured as a picket station in roll call mode. When you depress the TRANSMIT INITIATE switch on the TADIL A control panel, it will cause the DTS to perform which of the following operations, if any?
1. To immediately transmit the data
  2. To allow the unit to enter the net
  3. To assume control of the net as NCS
  4. None
- 3-65. On the NCS platform, the MISS CALL indicator on the TADIL A panel will light when a picket fails to respond to two successive interrogations.
1. True
  2. False
- 3-66. The address entered into the OWN STATION ADDRESS switches perform which of the following DTS functions?
1. Transmits the entered address to all other members of the net
  2. Transmits the entered address to NCS only
  3. Receives messages that match the entered address
  4. Transmits tactical data when the interrogation message address matches the entered address
- 3-67. On the NCS platform operating in a Link-11 net where the units are approximately 100 miles apart, which of the following values should be entered into the RANGE IN MILES switches?
1. 0 miles
  2. 25 miles
  3. 50 miles
  4. 100 miles

- 3-68. With a single address control indicator, an NCS platform can control what maximum number of participating units?
1. 5
  2. 10
  3. 15
  4. 20
- 3-69. Data exchange between the Link-11 DTS and the CDS computer is controlled by the DTS using which of the following control signal protocols?
1. External interrupts
  2. External functions
  3. Input data requests
  4. Output data requests
- 3-70. During a receive data cycle, the DTS performs which of the following actions when frame two of the stop code is detected?
1. The frame is processed as a data frame and sent to the computer
  2. The DTS processes the stop code and resets itself only
  3. The DTS sends the end of receive external interrupt to the computer
  4. The computer processes the stop code and closes the input data buffer
- 3-71. Which of the following actions is performed by the DTS when a control station stop code is received?
1. The DTS compares the next two frames received with the own station address
  2. The DTS resets all I/O timing circuits
  3. The DTS sends the next two frames received to the CDS computer
  4. The DTS sends the prepare to transmit data interrupt to the computer
- 3-72. When the DTS recognizes own station address, it transmits which of the following signals first?
1. Prepare to transmit interrupt
  2. The first frame of the preamble
  3. The phase reference frame
  4. Input data request
- 3-73. At the start of a transmit cycle, the output data request is first set active during which of the following frames?
1. The first frame of the preamble
  2. The first frame of the start code
  3. The phase-reference frame
  4. The second frame of the start code
- 3-74. Which of the following events takes place when the CDS computer does not answer an ODR from the DTS within the specified time limit?
1. The DTS generates the stop code
  2. The DTS hangs-up
  3. The computer generates an external function to clear the DTS
  4. The computer sends a stop code to the DTS
- 3-75. Which of the following events occur if an interrogated picket station does not answer an initial interrogations from the NCS within 15 frame intervals?
1. NCS interrogates the next station
  2. NCS waits another 15 frame intervals
  3. Link-11 network hangs up
  4. NCS retransmits the interrogation to the unit that did not reply